U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE OFFICE
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The Top 5 Significant South Texas Weather Related Events for 2009

South Texas can experience a wide range of weather phenomena over the course of a year, and the weather can change quickly and dramatically, leading to floods, drought, wildfires, hurricanes, tornadoes, severe thunderstorms and even winter storms. Here are the 5 most significant weather-related events which impacted South Texas in 2009.

Event	Date	Fatalities/Injuries/Losses
1) Drought/Wildfire	January-August	None/None/>$600 million South Texas ($4 billion all of Texas)
2) Record Heat	June- August	None/None/None
3) Drought Relief /Flooding	September-November	None/None/$25 thousand
4) Severe Storms		
Coastal Bend Straight Line Winds	March 26	None/None/$125 thousand
Green Acres EF-1 Tornado	May 24	None/None/$50 thousand
Flour Bluff Downburst	October 26th	None/None/$100 thousand
5) Snow and Sleet	December 4th	None/None/None

We empathize with those who experienced property damage in South Texas from weather related events in 2009. We would like to pass along a few safety tips:

1) Have a means to receive forecasts, watches and warnings 24 hours a day from your favorite local radio or TV Station, cable TV provider, internet provider, cell phone Company, or NOAA Weather Radio.

2) Know the name of your county and those counties around you, so that when warnings are issued you know where you are in relation to the storms.

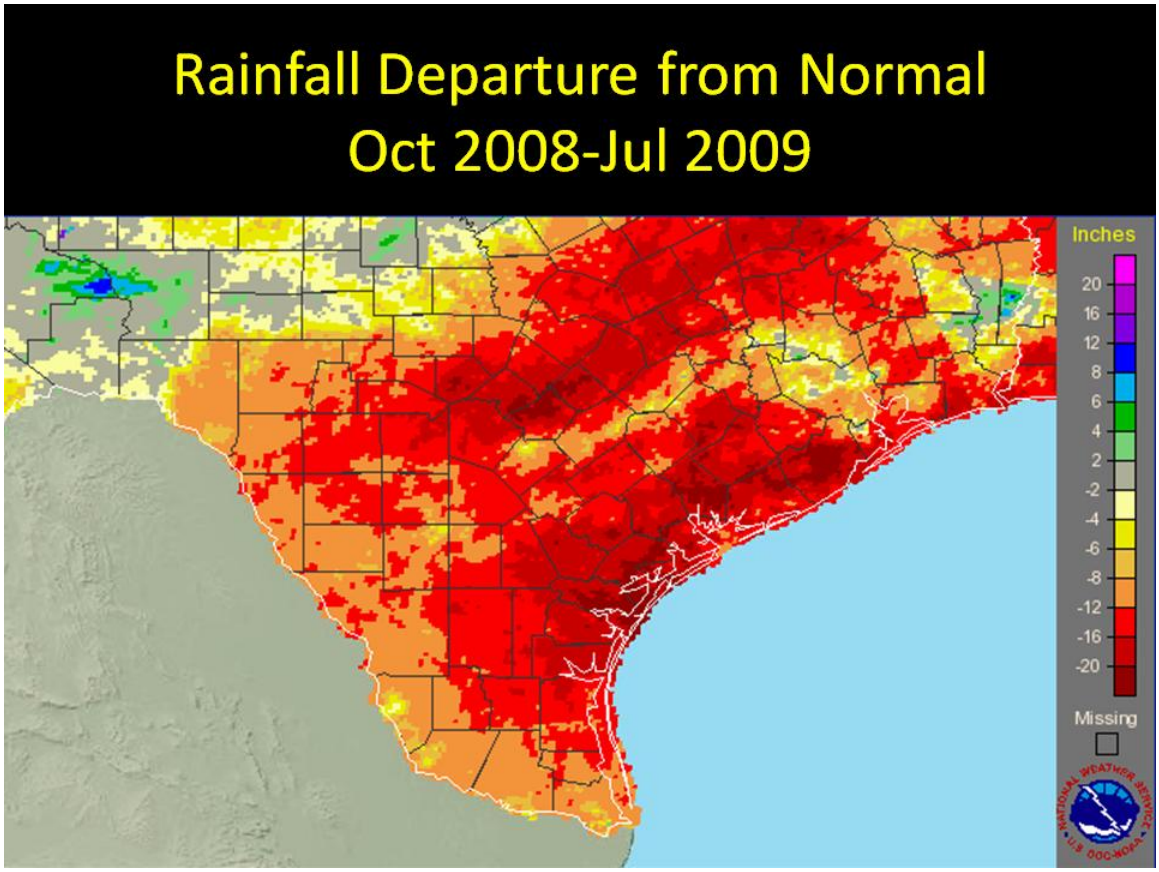
3) Take appropriate action when a watch or warning is issued. For more information go to www.weather.gov/corpuschristi

For more information for your radio, TV, newspaper, or web link, go to www.weather.gov/corpuschristi. Under Additional Info, click on Major Events and Storm Data.

1-In-100 Year Drought Devastates Region

Above: A South Texas farmer surveys the damage caused by drought

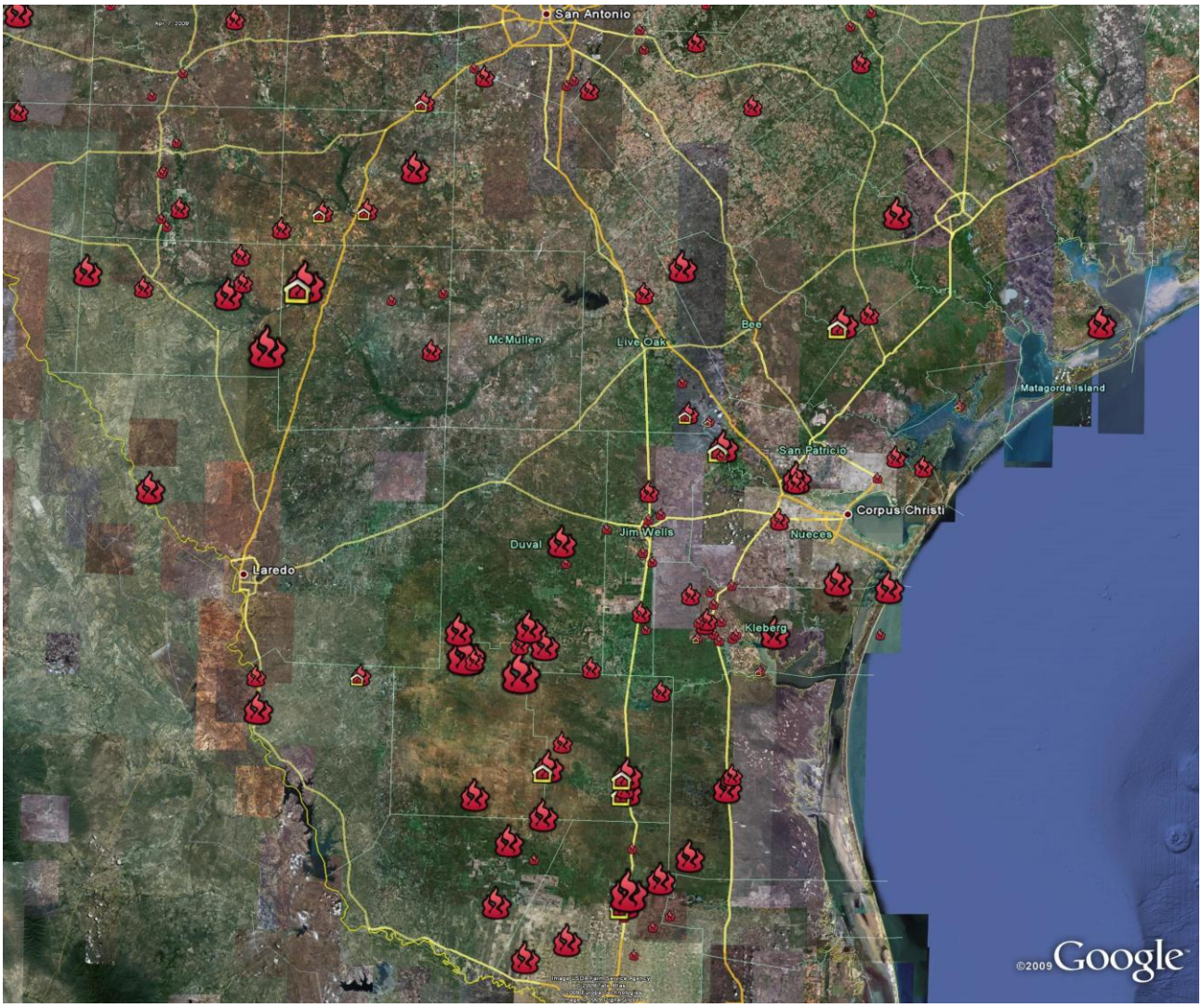
Drought conditions, which began in the fall of 2007, continued to plague much of Texas through August of 2009. The drought persisted through the first half of 2009 courtesy of La Nina conditions, which typically result in dry winters and springs across South Texas. In the heart of the drought in Texas was South Texas, where extreme to exceptional drought, the worst possible levels on the USDA's Drought Monitor, plagued most of the region. Most of South Texas was in a 1-in-100 year drought by summer of 2009. Texas Agriculture Commissioner Todd Staples spoke of the drought, "Summed up in one word: Devastating". The drought produced agriculture and livestock losses of $4 billion in Texas and $600 million plus in the Coastal Bend. Nearly 80 Texas counties were declared in a state of emergency. The drought also drastically reduced waters levels on some reservoirs and stream flows on rivers, forcing water restrictions and serving a blow to tourism involving boating, swimming and fishing.



Above: Rainfall Deficits show much of South Texas 10-25" below normal from Oct '08-Jul '09

From January 1st to August 31st 2009, Corpus Christi and Victoria experienced their second driest periods on record, with only 8.81 and 8.46 inches of rainfall recorded respectively. Widespread rainfall deficits of 10-20 inches, dating back to October of 2008, were observed across South Texas, with some locations near Victoria and the Coastal Bend approaching 2 feet! Failure of cotton and sorghum crops was estimated at 95% in many areas. Ranchers were forced to import hay for supplemental feeding of livestock, and many were forced to sell off their cattle entirely. Water restrictions were imposed in Victoria as river flows along the Guadalupe River became critically low. The capacity of Lake Corpus Christi fell to around 28% by the end of the summer of 2009, and 68% at Choke Canyon Reservoir.

Periods of critical fire weather patterns during the drought also produced devastating wildfires across the state, with over 76 thousand acres burned alone in South Texas in 2009 and over 180 thousand acres scorched in 2008. Unfortunately, nearly 400 structures were destroyed by wildfires in South Texas in 2008 and 2009, but thousands more were threatened and saved. In particular, on April 2nd 50 mph winds and single digit relative humidity values contributed to several wildfires across South Texas, one of which destroyed 33 homes in the town of Lagarto. Hundreds of other homes were saved that day and week across South Texas due to prepositioning of state and federal resources across South Texas, which was a direct result of the WFO Corpus Christi forecasts.



Above: Large fires the Texas Forest Service responded to in South Texas during 2008 & 2009

Above: Burn scar after a devastating wildfire through the community of Lagarto on April 2nd 2009

The Heat Was On and Temperature Records Soared

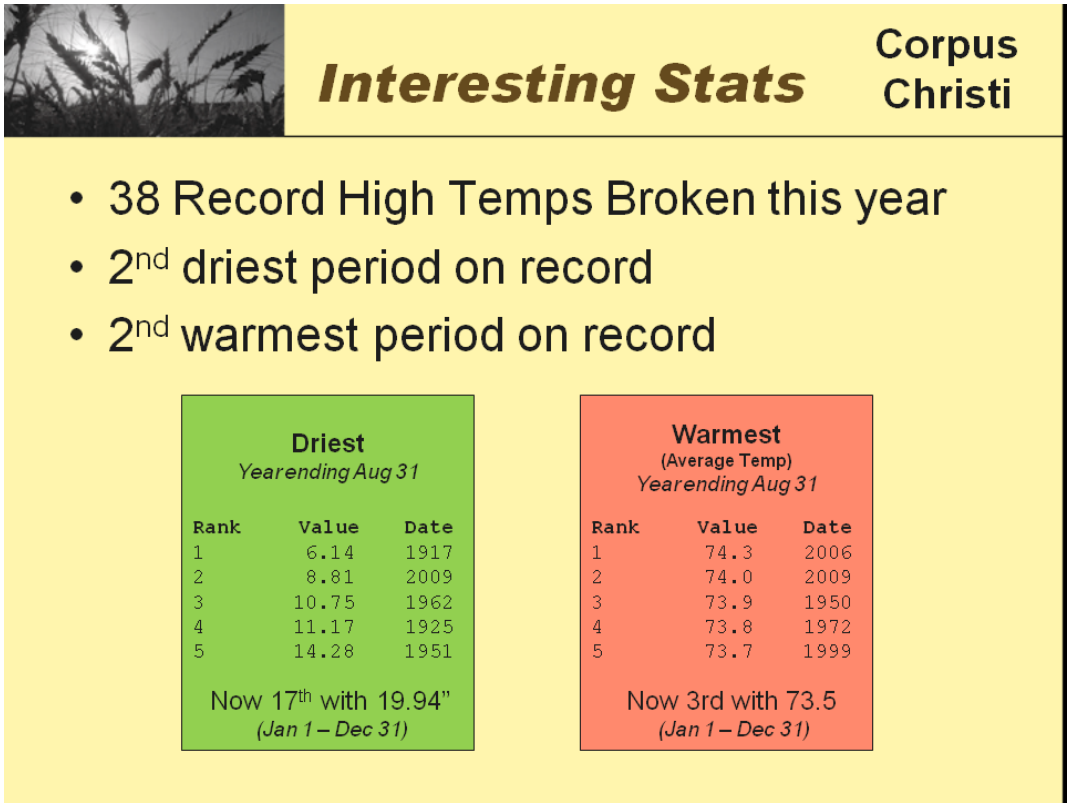
With the drought conditions across South Texas came the record heat, especially during the summer of 2009. A 1-in-100 year drought produced extremely low soil moisture conditions across South Texas. Dry soil conditions can lead to hotter than normal days, and the lack of cloud cover and precipitation can make them even hotter.

Corpus Christi experienced its second warmest average daily temperature for the January 1st-August 31st period, recording 74.0 degrees, just missing the number one spot of 74.3 degrees set in 2006. Corpus Christi also experienced its warmest average daily temperature for a summer (June 1-August 31st), measuring 86.8 degrees, beating out 1998 which had an average daily summer temperature of 85.9. Factoring in just high temperatures (and not low temperatures) during the summer, Corpus Christi had an average high of 97.4 degrees, shattering the old record of 94.9 degrees set in 1998. Thirty-eight record high temperatures were broken in Corpus Christi during 2009, which was a record for number of record highs in a year!

The story was similar in Victoria, where they experienced their 3rd warmest average daily temperature for the January 1st-August 31st period. Victoria also experienced its warmest average daily temperature for a summer (June 1-August 31st), measuring 86.6 degrees, beating out 1998 which had an average daily summer temperature of 86.2 degrees. Factoring in just high temperatures (and not low temperatures) during the summer, Victoria had an average high of 98.4 degrees, beating the old record of 98.1 degrees set in 1917. Thirteen record high temperatures were broken in Victoria during 2009.

Laredo recorded its second warmest summer as well (June 1-August 31st), with an average daily temperature of 89.8 degrees. The summer of 1998 was the warmest on record measuring 91.7 degrees. Factoring in just high temperatures (and not low temperatures) during the summer, Laredo had an average high of 102.2 degrees, the third warmest average summer high temperature on record.

A transition to El Nino conditions brought welcome relief with beneficial rainfall and a series of cold fronts resulted in below normal temperatures during the fall and early winter of 2009.



Interesting Stats

Victoria

- 13 Record High Temps Broken this year
- 2nd driest period on record
- 3rd warmest period on record

Driest
Year ending Aug 31

Rank	Value	Date
1	8.07″	1917
2	8.46″	2009
3	9.20″	1956
4	9.96″	1988
	9.96″	1954

Now 29th with 29.88"
(Jan 1 – Dec 31)

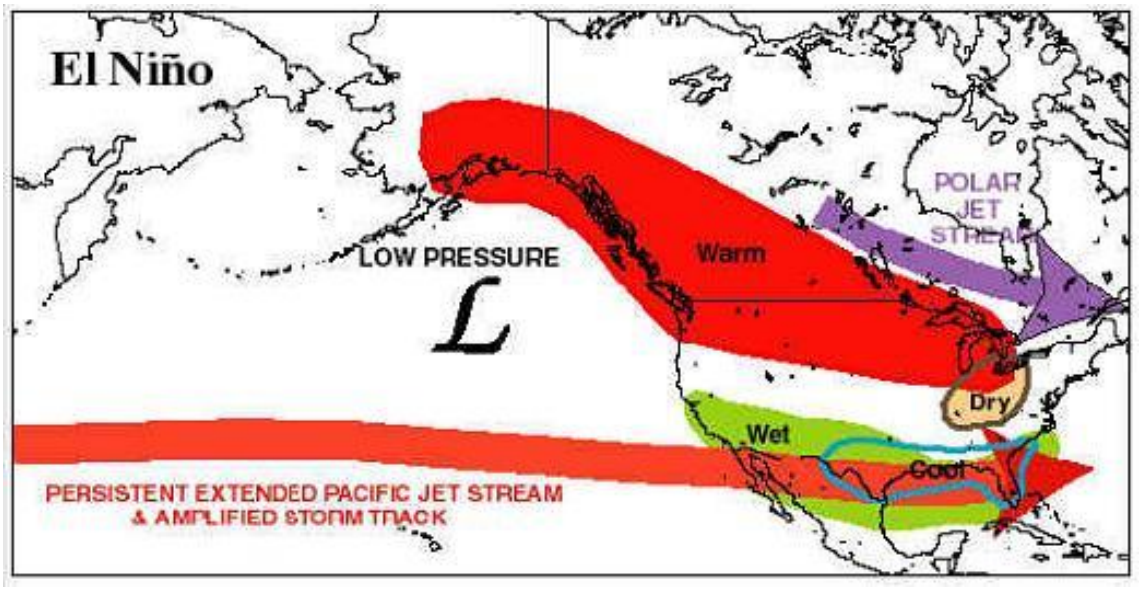
Warmest
(Average Temp)
Year ending Aug 31

Rank	Value	Date
1	74.6	2000
2	74.1	1939
3	74.0	2009
	74.0	1938
	74.0	1933

Now 15th with 71.3
(Jan 1 – Dec 31)

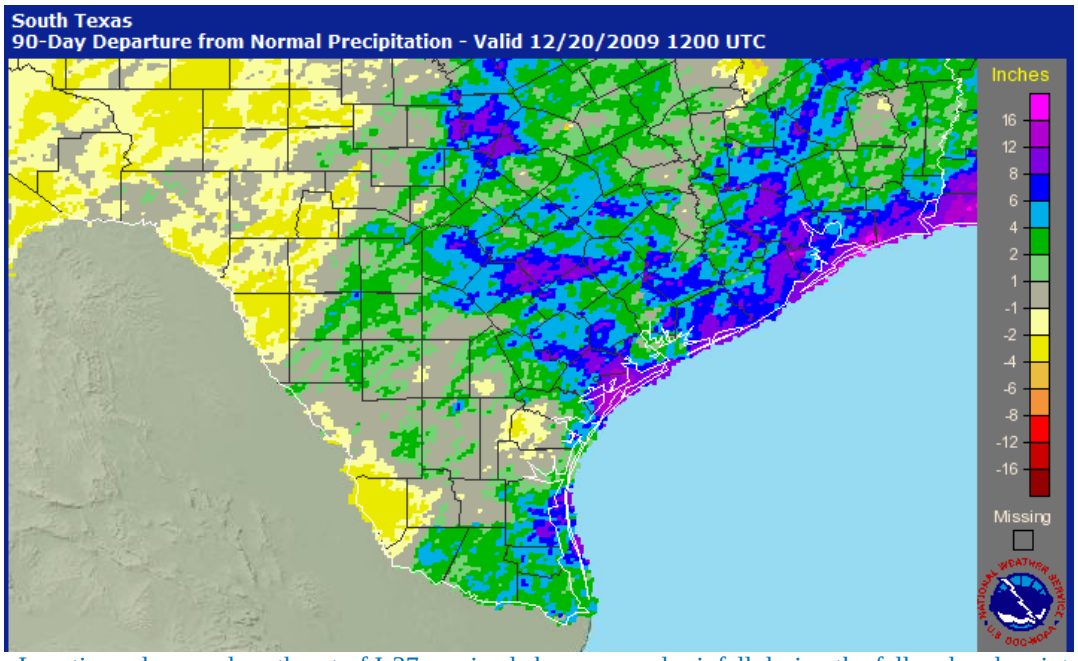
El Nino Materializes, Drought Relief Finally!

A quick transition from La Nina to El Nino conditions in the Pacific Ocean occurred during the summer of 2009. This in part led to a decrease in the number of Atlantic tropical cyclones during the summer and fall months. Traditionally, El Nino conditions lead to cooler and wetter falls and winters in South Texas, as the southern branch of the upper level jet stream shifts south over the region, bringing much more active weather.



Above: Typical El Nino Winter Conditions across North America

The southern branch of the jet stream did shift south over Texas during the fall and early winter of 2009, resulting in several wet weather systems. From September 1st through December 20th Corpus Christi has received 15.84 inches of rainfall, Victoria 21.42 inches, Rockport 21.53 inches, Alice 9.28 inches, Kingsville 20.37 inches, Beeville 22.70 inches, Cotulla 13.23 inches, and Laredo 8.04 inches. Much of the region was near to above normal from September through December, with only isolated spots in western Nueces and southwestern Webb counties receiving below normal rainfall.



Above: Locations along and northeast of I-37 received above normal rainfall during the fall and early winter, with some locations over 10 inches above normal for the period.

Some of these weather systems actually resulted in flash flooding and river flooding across the region. On September 9th a series of thunderstorms containing very heavy rainfall moved across the city of Kingsville and the south side of Corpus Christi, producing between 3 and 5 inches of rain. Widespread flooding was reported throughout the city of Kingsville, with many streets flooded and numerous cars becoming stranded in the high water. Several low water crossings were flooded and media outlets reported water entering a few homes.

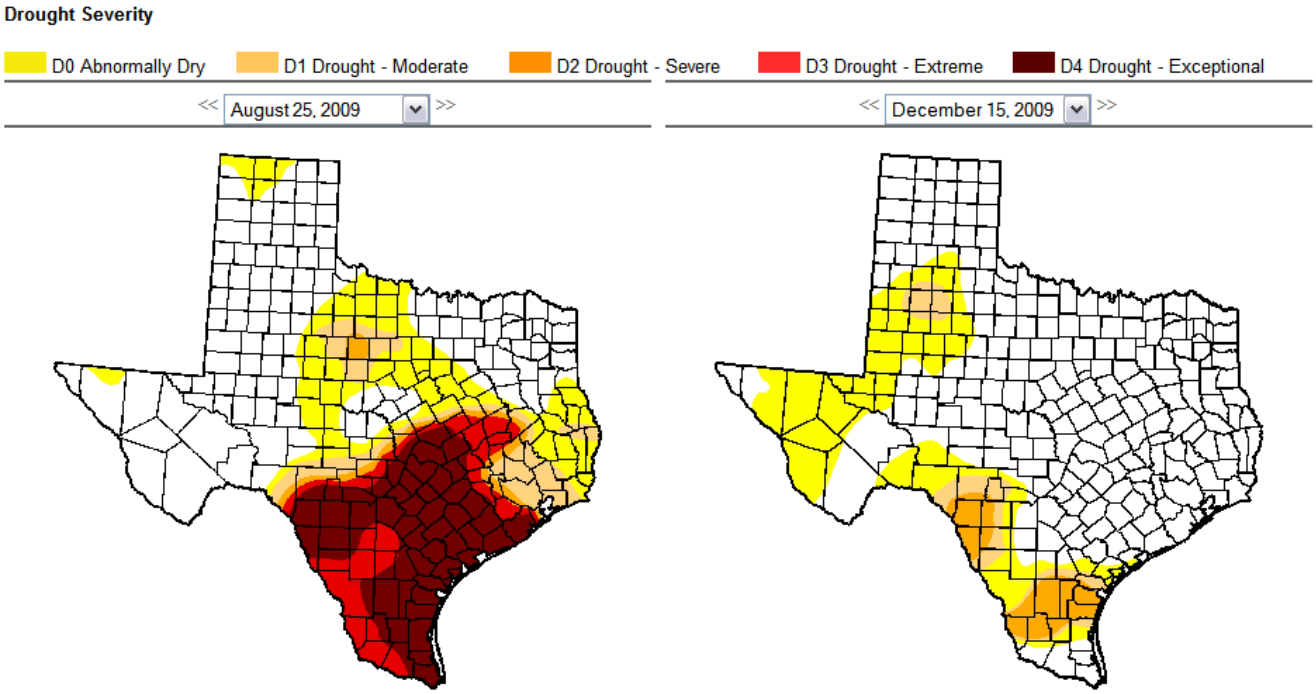
On September 29th, slow moving thunderstorms merged over the city of Laredo, producing between 2 and 5 inches of rainfall in just 2 hours. The Laredo Fire Department reported ten intersections closed in the city due to flash flooding, with several stranded motorists and high water rescues. In addition, several residential homes scattered throughout the city were flooded.

Above: Shopping center flooded in Laredo during heavy rainfall on September 29th, 2009.

On October 3rd between 5 and 8 inches of rainfall fell near and north of Beeville during the evening hours, which resulted in flash flooding and a high water rescue.

Late in the evening of November 19th and into the morning of the 20th, thunderstorms dumped very heavy rainfall across Aransas County. Radar estimates and ground truth confirmed between 4-8 inches of widespread rainfall occurred across the county, with isolated totals around 12 inches. The heavy rainfall led to several city streets in and around Rockport being flooded during the evening and overnight hours. Several vehicles were stranded in high water and eight homes were flooded.

The beneficial fall and early winter rainfall helped lessen the drought severity across South Texas, and even ended it all together in many places. At the peak of the drought in August all of South Texas was either considered in extreme or exceptional drought. By the middle of December only moderate to severe drought conditions were left over the southern Coastal Bend and southern Brush Country, with the rest of South Texas out of meteorological and agricultural drought conditions. However, reservoir storage remains critically low at Lake Corpus Christi.



Above: Drought conditions improve over South Texas during the fall and early winter of 2009. Left map shows drought severity at its peak in late August. Right map shows how conditions had improved by mid December.

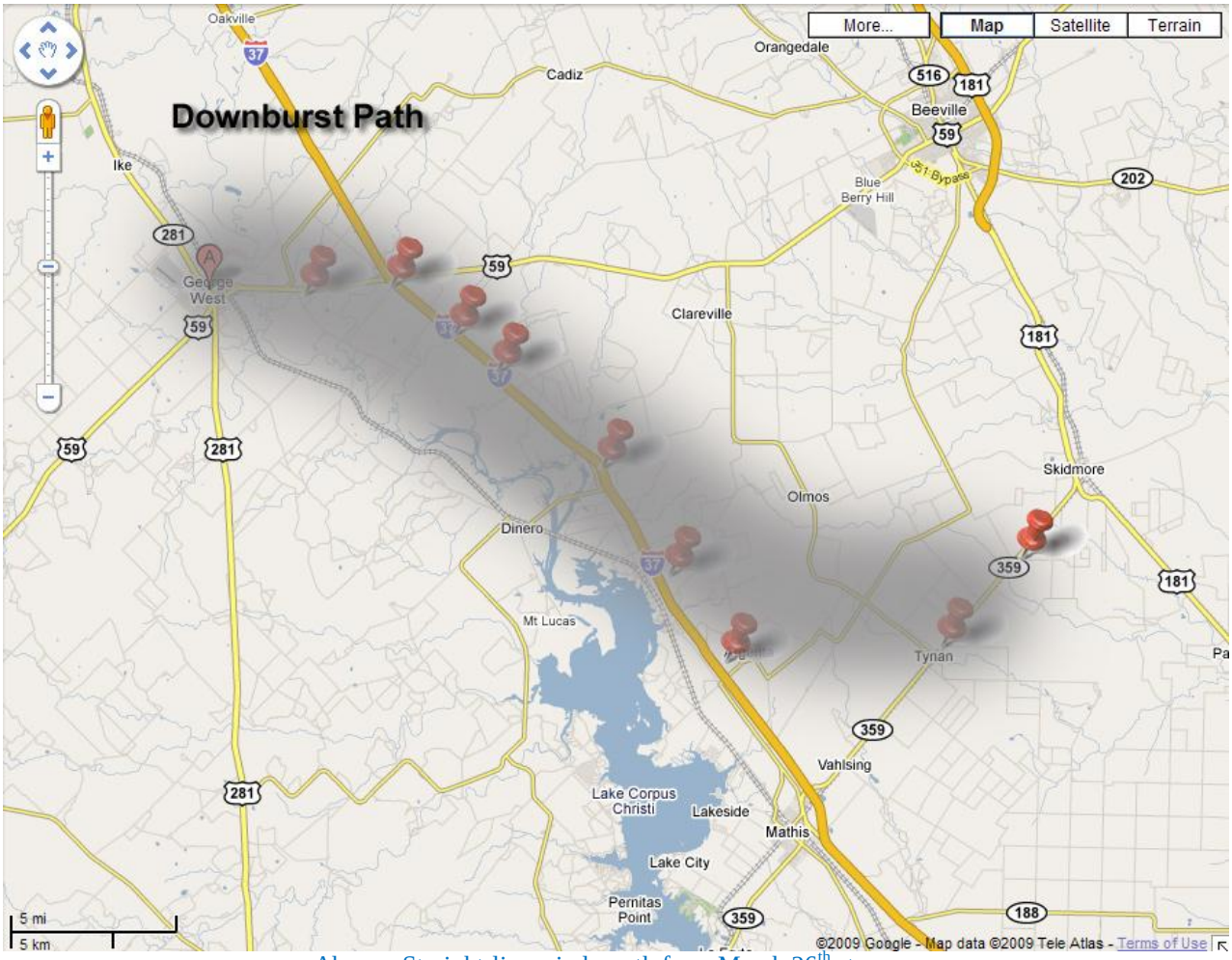
Severe Storms Cause Damage in Coastal Bend

Above: Locations of severe storms and flash flooding in South Texas during 2009.

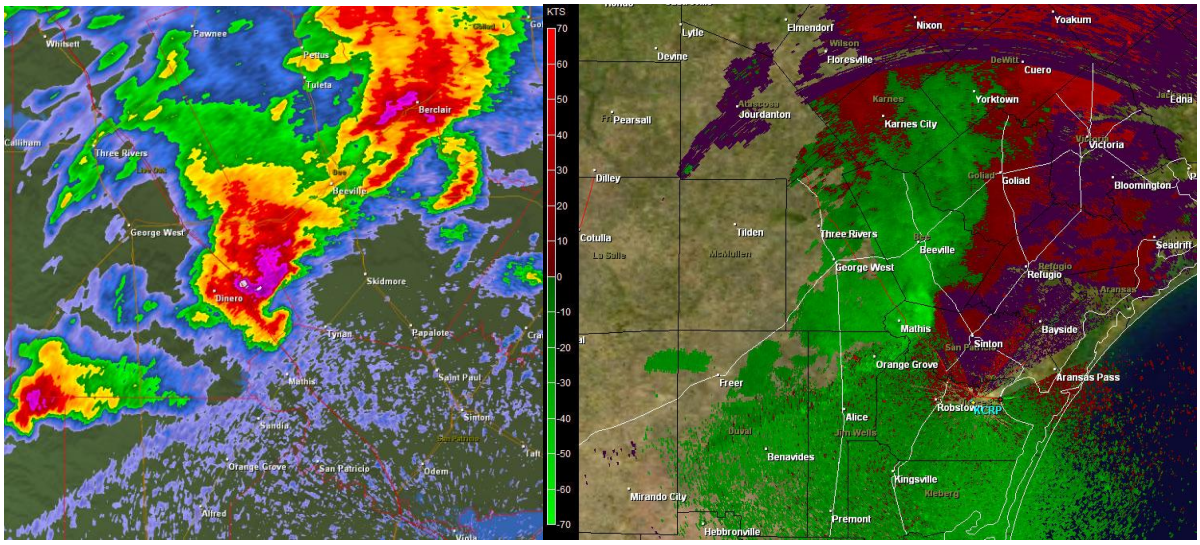
Although drought conditions produced fewer severe storms than normal, there were several episodes that did occur. We have picked three of the more notable events for review:

Coastal Bend Straight Line Winds

Scattered thunderstorms affected portions of South Texas Thursday March 26th, 2009. A few of the storms became severe and produced damaging winds, large hail, and frequent lightning. The worst damage was associated with a supercell thunderstorm that developed over central Live Oak County near George West. The supercell moved east-southeast across the extreme southern portion of Bee County into the northern portions of San Patricio County before weakening. This storm produced a 5 to 10 mile wide swath of damage through these counties from straight line winds. A couple of semi-trucks were turned over along Interstate 37. Several power poles were snapped or blown over along with highway and business signs blown out. Medium to large tree branches were snapped in some areas along the path. Damage to cables on cell phone towers was also observed. The winds were estimated to be 60 to 70 mph with gusts as high as 80 mph. The storm also produced large hail ranging in from quarter to golf ball size. Damage was estimated conservatively to be around $125 thousand.



Above: Straight-line wind swath from March 26th storm.
Below: Reflectivity and velocity radar data from the March 26th storm.



NWS radar reflectivity data (left image) shows the classic "hook" shaped signature just north of Lake Corpus Christi. This hook is indicative of the mesocyclone, an area of strong rotation within the updraft region of the supercell thunderstorm. If a tornado were to occur, it would be in this region. Fortunately, only 20% of supercells actually produce tornadoes. Based on a NWS storm survey and the radar wind velocity data (right image), it appears most of the damage was attributed to a large area of straight-line winds. Although we can't completely rule out that a tornado might have occurred.

Green Acres EF-1 Tornado

The Coastal Bend experienced two days of severe weather on May 23rd and 24th. This included a tornado in Green Acres, a community near Ben Bolt in east central Jim Wells County. A NWS team surveyed the area and concluded that an EF-1 tornado touched down near the community of Green Acres. The tornado was 50 yards wide and traveled two tenths of a mile before lifting back up. One mobile home was completely destroyed while a roof was removed from another. Numerous large tree branches were broken along the path and a couple of trees were uprooted. Winds were estimated to be around 105 mph. Fortunately, no residents were home at the time. Damage was estimated at $50 thousand.

Above: A mobile home destroyed in Green Acres from an EF-1 tornado on May 24th.

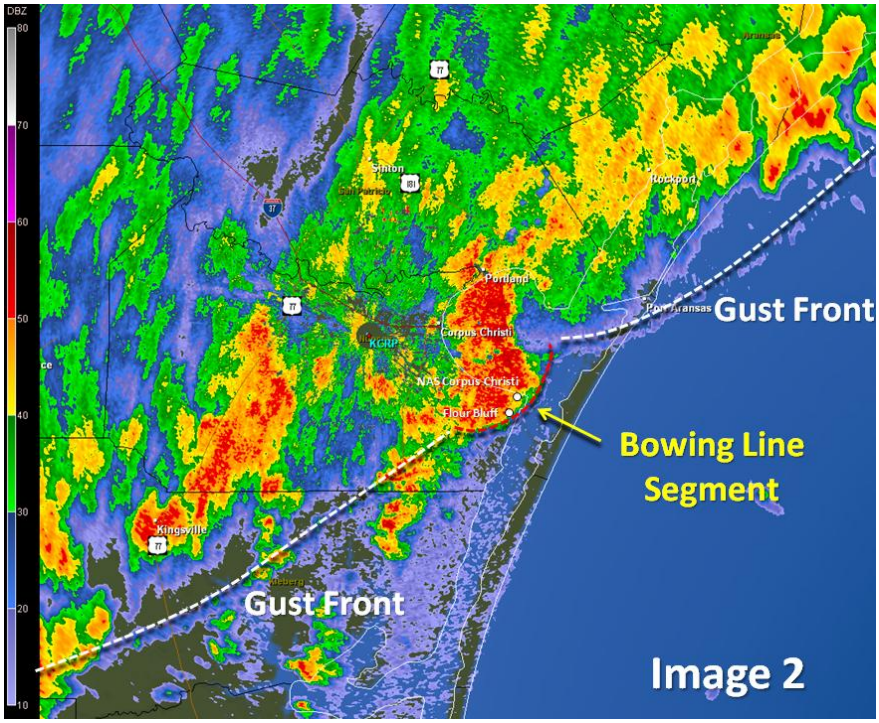
Flour Bluff Hurricane Force Downburst

A strong cold front moved through the Coastal Bend around noon on October 26th, 2009, producing strong to severe wind gusts, thunderstorms, and heavy rainfall. Most notable was a severe thunderstorm which produced a downburst over NAS Corpus Christi and Flour Bluff, and combined with the gradient wind behind the front to produce wind gusts in excess of 80 mph. These wind gusts snapped several power poles in half along South Padre Island Drive and Flour Bluff Drive, bringing down power lines on vehicles and trapping motorists. In addition, numerous large tree limbs and trees were snapped and uprooted on NAS Corpus Christi and in Flour Bluff. Over 180 feet of security fence around the base was blown down. In addition, several buildings on NAS Corpus Christi suffered torn roofing and gutters, damaged awnings, and one building had a section of metal roofing blown off. A few trailers and boats were also overturned. A NWS Storm Survey Team also observed business signs blown out, car-ports damaged, and windows blown out on multiple homes in the Flour Bluff area. Around 9,500 customers were left without power. Damage was conservatively estimated at $100 thousand, and fortunately nobody was injured.

Above: Shelf cloud approaching the Corpus Christi International Airport, associated with Oct 26th severe storms.

In addition to the severe wind gusts at NAS Corpus Christi and Flour Bluff, very strong wind gusts were observed across much of the Coastal Bend, resulting from strong pressure rises behind the front across the Brush Country and Rio Grande Plains. Below are the peak wind gusts for the event across the Coastal Bend:

Port Lavaca	45 MPH	Port O'Connor	50 MPH
Padre Island Seashore	50 MPH	Rockport	51 MPH
Corpus Christi Intl	51 MPH	NAS Kingsville	52 MPH
Port Aransas	53 MPH	Robstown	56 MPH
Packery Channel	75 MPH	NAS Corpus Christi	81 MPH



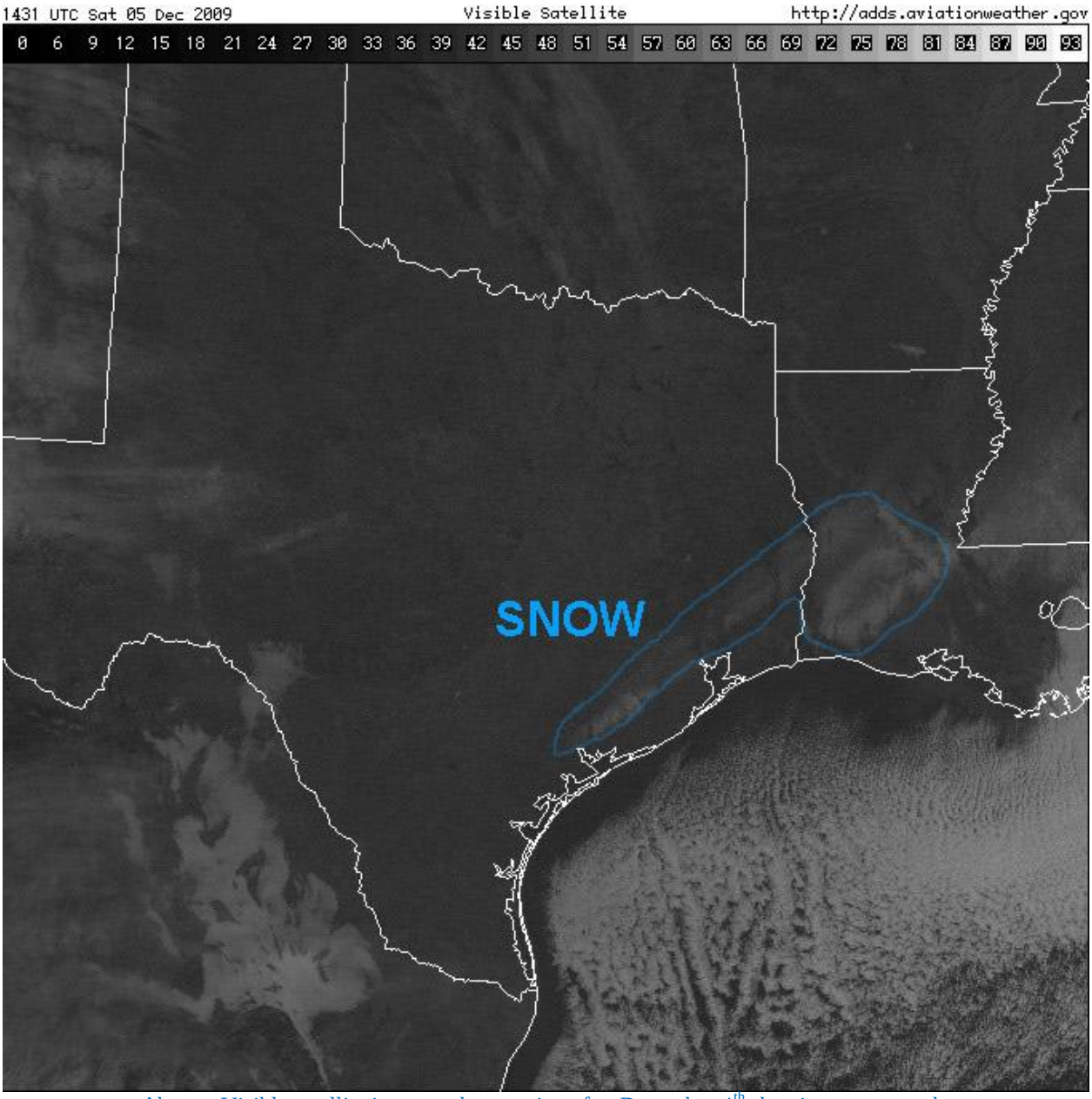
Above: Severe storm over NASCC and Flour Bluff, producing a downburst and bowing segment on radar.

Let it Snow, Let it Snow, Let it Snow!

Snow is rare in South Texas, but when it does happen chances are it occurs during an El Nino Winter. Since 1887, El Nino conditions have been observed during South Texas winters only 20% of the time. However, from these recorded snow events, 67% of them occurred during an El Nino winter. Chalk another winter snow event up for South Texas during an El Nino year, this time on Friday, December 4th 2009.

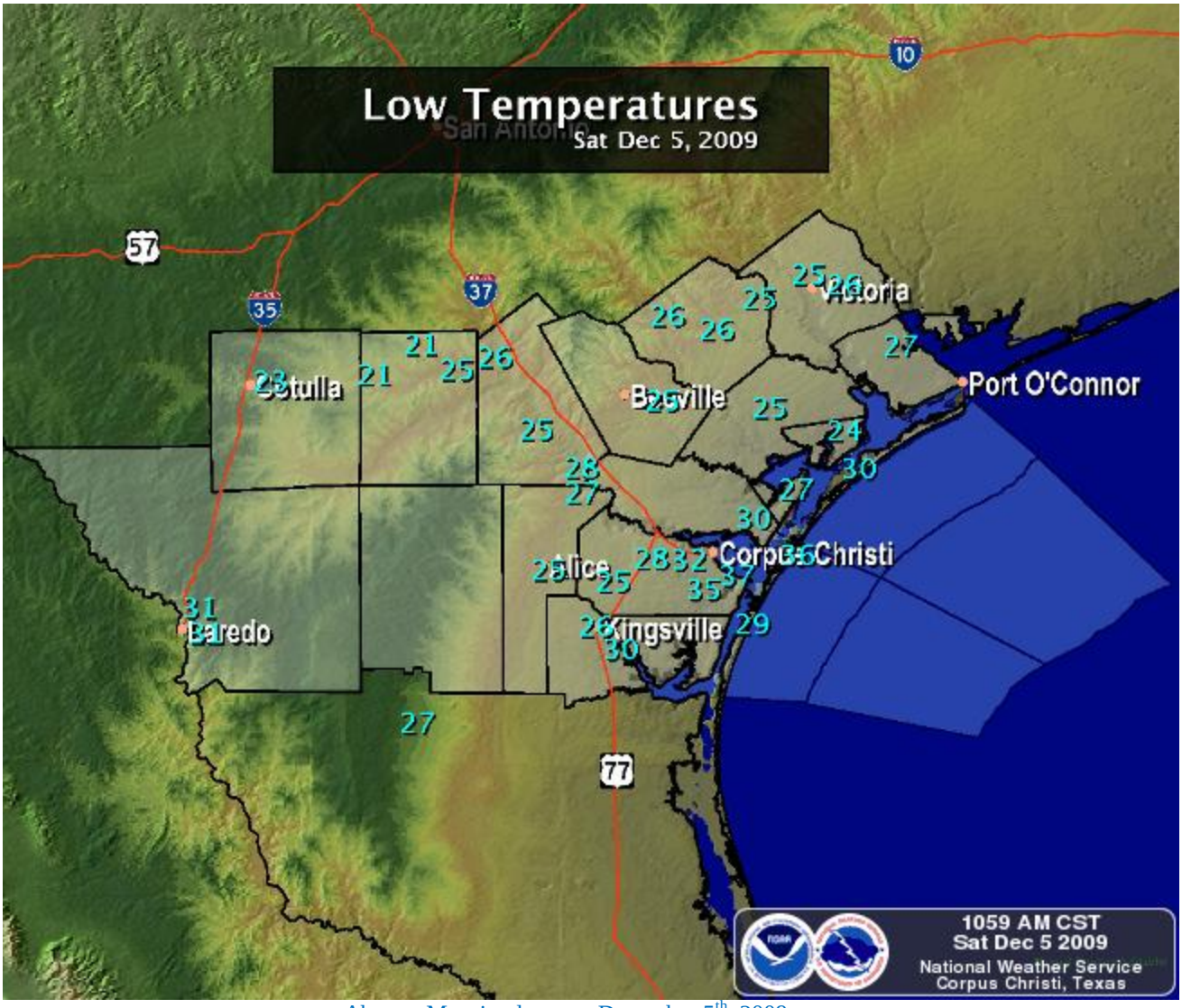
A very cold, post frontal airmass was in place across South Texas on December 4th through a sufficient depth of the atmosphere to produce wintery precipitation. An upper level disturbance moved across South Texas generating initially rain during the early morning hours of the 4th. The precipitation quickly changed over to snow across the Victoria Crossroads region and eventually mixed in with the rain all the way south to Corpus Christi. Accumulations were limited to the Victoria area, where a dusting to up to ½ of an inch stuck on mainly grassy surfaces. Sleet was also observed from Alice to Kingsville to Corpus Christi, however surface temperatures were too warm for any wintery precipitation to stick this far south. Victoria officially recorded 0.2" of snow, and it was the second earliest measurable snowfall of a winter in recorded history.

Above: Snow in Edna, Texas on December 4th.



Above: Visible satellite imagery the morning after December 4th showing a snowpack.

The disturbance passed east of the area by the evening of December 4th, and clearing occurred setting up a hard freeze across portions of South Texas. Lows on the morning of the 5th dipped into the low to mid 20s along and north of a Cotulla to Alice to Rockport line, with upper 20s and lower 30s observed south of this line.



Above: Morning lows on December 5th, 2009.